SolarImmersion
Use 100% of Solar PV Surplus

SOLARIMMERSION IV Advanced Installation Manual v1.2

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Safety Notes

Potentially dangerous High Voltages are present and therefore this equipment should only be installed by a qualified person.

Connect the equipment according to the correct IEE regulations and separate all wiring according to IEC1010.

Make sure all screw terminals are tight before you switch the equipment on. (The terminal screw is rated 0.5N•m torque)

Do not touch any circuitry after you have connected the equipment, due to potentially lethal voltages on the circuit board or connector terminals.

Equipment designed for Pollution – Degree 2 environments only. This means you must install it in a clean, dry environment.

Overview

SOLARIMMERSION IV is an intelligent surplus power control system for your PV system. It diverts surplus power which would normally be exported to the grid. When the unit is connected to an immersion heater, it can heat water for free using the surplus power.

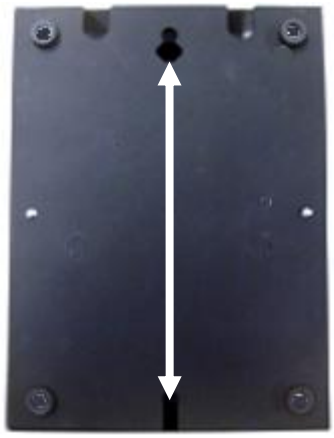
SOLARIMMERSION IV - Highlights:

- Heats water using surplus power from all sorts of micro-generation systems (wind turbines, hydro power)
- Keeps exported power as close to zero as possible by adjusting power levels to the immersion heater.
- Single sensor clip.
- LCD display for easy control and management of the unit
- No need to change immersion heater or the tank.
- No manual intervention required to use surplus power.
- Built-in override and boost timer functions to an immersion heater manually if required.
- Low threshold levels meaning, less wasted power.
- Diverts as little as 20W of surplus power
- Built-in multifunction relay for Second load.
- Internal thermal protection
- Multiple loads available

2. Technical Specifications

Weight/Dimensions

Weight: 650g



Mounting holes centre: 175mm

Electrical Specifications

Description	Min	Nominal	Max
Supply Voltage (VAC)	220	240	260
Supply Frequency (Hz)	45Hz	50Hz	55Hz
Load Current (A)		13	16
Load Size (kW)		3	4
Relay Contact Voltage (VAC)			250
Relay Contact Current (A)		13	16
Clamp Current (A)			100
PV System Size(W)	500	4000	No Max
Operating Temperature (˚C)	-5	20	40

3. Installation

Mounting

To keep the installation quick and easy, we recommend that SOLARIMMERSION IV is installed near to the consumer unit as most of the connections required can usually be found there.

When choosing a suitable place to install SOLARIMMERSION IV, the following should be considered:

- Near the main incoming mains supply of the property
- Access to the immersion heater supply cable (normally in the consumer unit)
- Access to suitable supply via 16A MCB or 13A fused outlet
- Ease of access and visibility of the SOLARIMMERSION IV LCD Screen and control buttons
- Good ventilation to keep air flowing through the unit – **at least 100mm around the unit**.
- Suitable cable access point location – through the top of the unit

Secure the SOLARIMMERSION IV to the wall with the two screws or using suitable fixings for the surface type.

Electrical Installation

ATTENTION!
Electrical connection should only be made by a qualified person. **Please do not attempt to install SOLARIMMERSION IV unless you hold such qualifications or are an experienced electrician. Alterations to fixed wiring and/or opening the consumer unit may be required – risk of death by electrocution.**

Locate the most appropriate cable access point at top of the unit to make connections to the unit according to the wiring diagram.

Loads

The proportionally controlled primary and secondary loads connected (alone or combined) should not exceed 3kW. The load should not include digital circuits, as they may be affected by the modulated output from the SOLARIMMERSION IV

The relay terminals could be used to drive small inductive or resistive load when LOAD 2 is enabled.

Terminals

ATTENTION!
Make sure the wiring cables are securely connected and fully tightened with the rising clamp terminals. (The terminal screw is rated 0.5N•m torque) Failure to do so can result in fire or the SOLARIMMERSION IV unit being damaged.

Power Terminals

Terminal	Description
O/P (Load Out)*1	Proportional output to the load, Max 3kW
L (Live) *2	Main Live 240 V input supply from 16A MCB / 13A fused outlet
N (Neutral) *2	Mains Neutral (All neutral terminals internally connected)
E (Earth) * 3	Main Earth

Relay Terminals

Terminal	Description
NO	Normally open relay terminal
COM	Common relay terminal
NC	Normally closed relay terminal

All relay terminals are volt free and max current is **16A**

Sensor Terminal

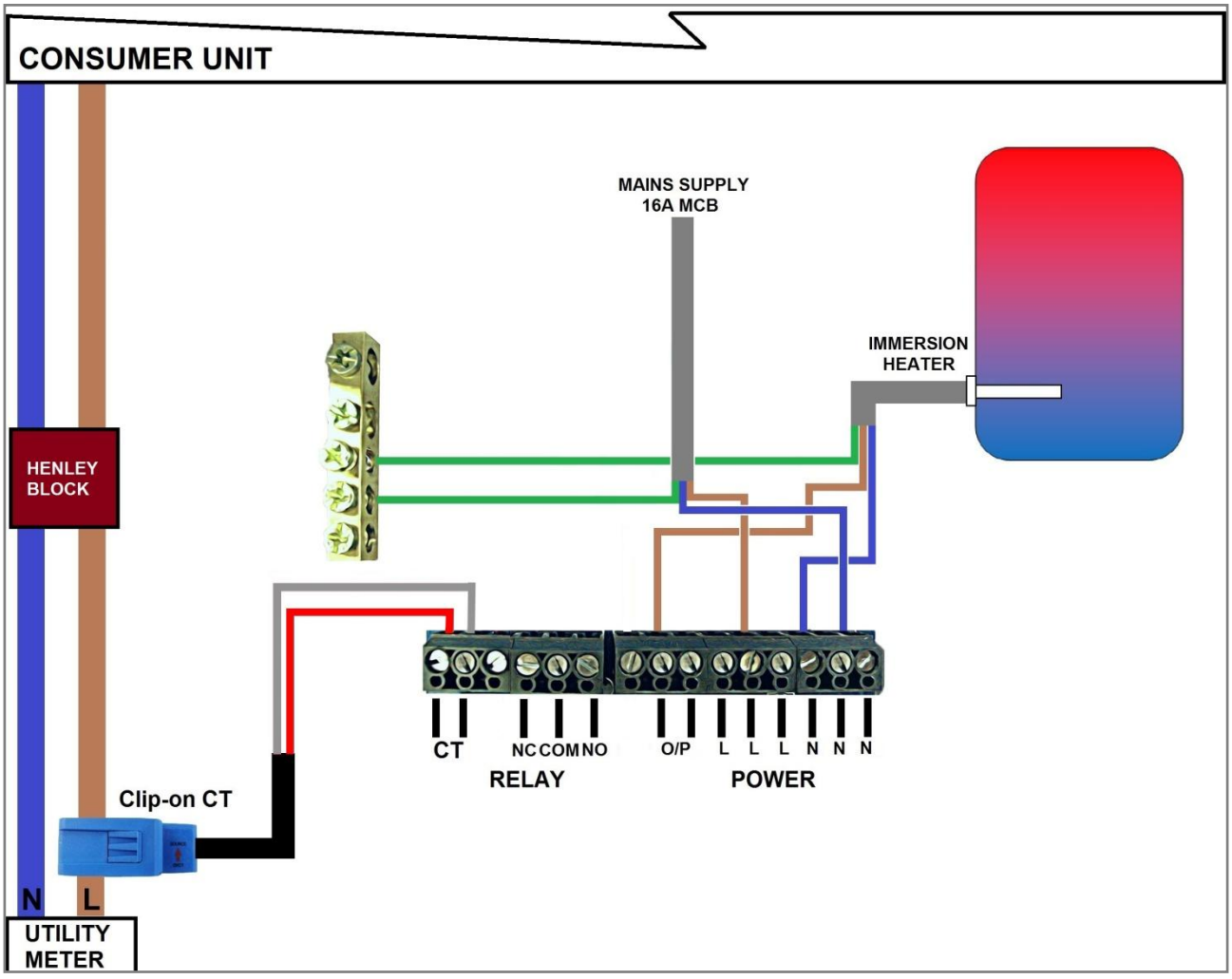
Terminal	Description
CT	AC current sensor clamp terminal
CT	AC current sensor clamp terminal

Wiring Diagrams & Software Setup

Single Load System

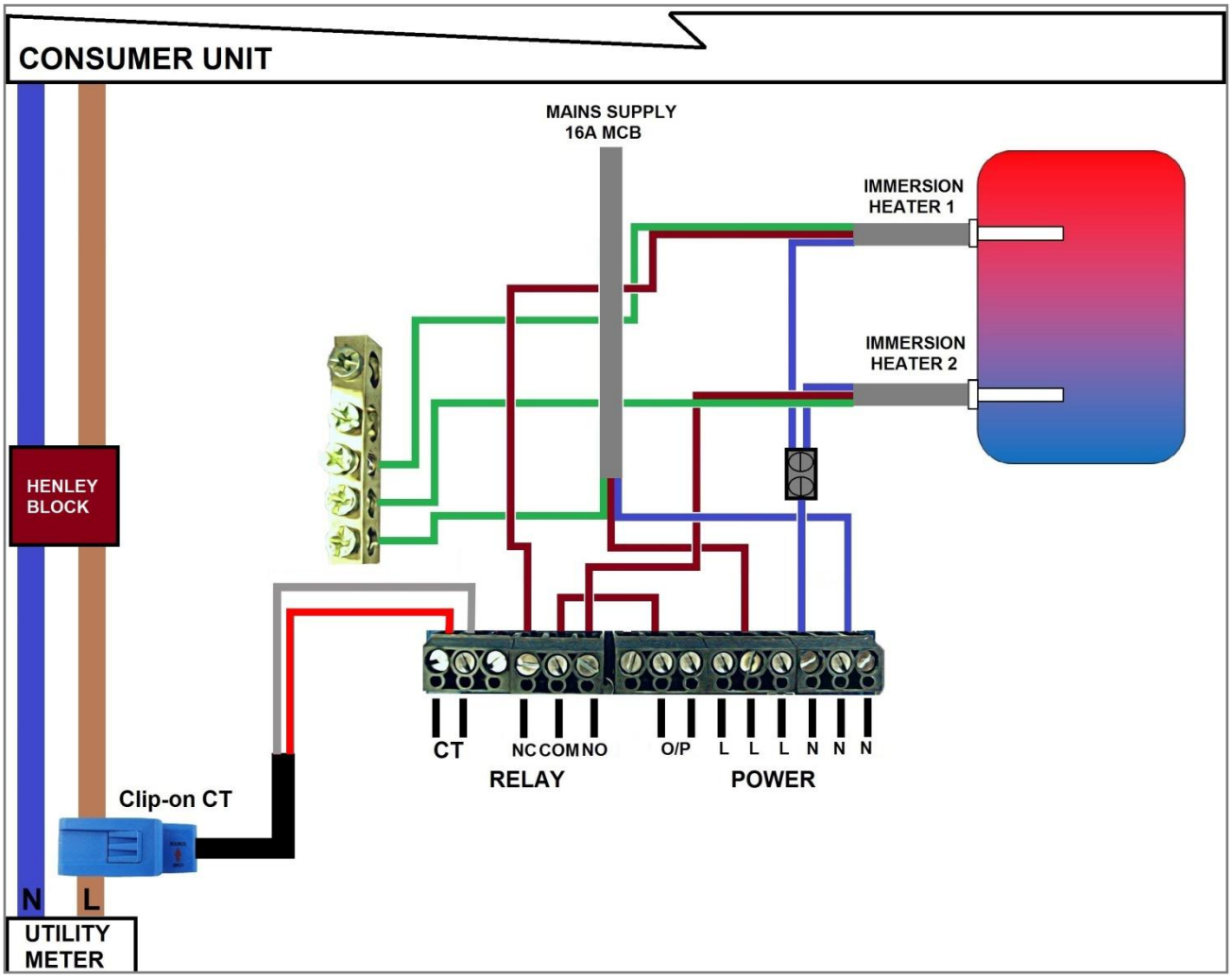
For single heater control, no relay terminal wirings are required as the secondary load options is not used.

The default factory settings of the SOLARIMMERSION IV are optimised for a single heater configuration. This keeps the installation simple, as the only menu setting required is setting the time.



The default factory settings of the switch is configured for single heater system. So no setting changes are required other than setting up the time. If any settings were changed before, please do a factory reset of the switch via the menu controls.

Dual Load System



With a single Load system, the surplus will flow back to the grid once the water is hot and the thermostat cuts off. This could be avoided using a dual heater system. The secondary load (LOAD 2) will be turned on when the primary load's (LOAD 1) thermostat is cut off. This improves the efficiency of the system.

Menu Settings for Single Load and Dual Load systems:

Set time

Step no.	Button Action	Display	Description
	Start	16:23:03 LOAD 1	Home
1	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
2	ENT	↓	
3	↓↑	SET TIME - HOUR 16:23:31	Set Time - Hours
4	ENT	↓	
5	↓↑	SET TIME - MINS 16:23:31	Set Time - Minutes
6	ENT	↓	
7	↓↑	SET TIME - SECS 16:23:31	Set Time - Seconds
8	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
9	ESC	↓	
	Finish	16:23:03 LOAD 1	Home

Set secondary load

Step no.	Button Action	Display	Description
	Start	16:23:03 LOAD 1	Home
1	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
2	↓↑	↓	
		LOAD 2 DISABLED	Load 2 - Menu
3	ENT	↓	
4	↓↑	LOAD 2 DISABLED	Load 2 - Disabled
		↓	
5	↓↑	LOAD 2 ENABLED 30 mins	Load 2 - 30 mins option (For 60mins Press ↓↑ again)
6	ENT	↓	
		LOAD 2 ENABLED 30 mins	Load 2 - Enabled for 30 mins/60mins
7	ESC	↓	
	Finish	16:23:03 LOAD 1	Home

Menu Item	Displayed	Value	Remarks
Secondary Load Status	LOAD 2	Enabled	Enable the secondary load
Secondary Load Time	30min or 60min	30 or 60 (Minutes)	How long the secondary load should run before switching back to primary load

Example Scenario for dual system:

The secondary load will be activated 3 minutes after the thermostat in the immersion cuts off & there is surplus power.

1. The primary load thermostat cuts off
2. The system has a surplus of 1000w at the point when the primary load cuts off
3. The system still maintains a 1000W surplus after 20 minutes

If the 'Load time' is set to 60, the unit will deactivate LOAD 2 after 1 hour and activate LOAD 1. If the LOAD 2 thermostat is still at 'cut off' stage, the LOAD 2 will be activated after 20 minutes and the whole cycle will continue.

Sensor Clip Installation

The correct installation and positioning of the current sensor clip is very important for the efficient operation of SOLARIMMERSION IV. Wrongly installing the sensor clip could result in importing of power and the user incurring additional costs for electricity.

The sensor clip should be installed at the main incoming grid supply to the building which could be from the utility/electricity meter. (Please note - it is Utility/Electricity meter **NOT** the PV generation meter). Close the clip around the Live or Neutral cable from the utility/electricity meter. Please ensure the sensor clip is positioned nearest to the utility/electricity meter as possible. **(Only open a consumer unit if you are qualified to do so or are an experienced electrician).**

If there is more than one consumer unit, the clip must be positioned at the primary income source – before it splits.

IMPORTANT
SENSOR CLIP HAS TO BE ON THE UTLITY/ELECTRICITY METER TAILS AND ALWAYS ENSURE THE CLIP IS CLOSED SECURELY AROUND THE CABLE!

Connect the clamp wire to the terminals inside SOLARIMMERSION IV. If the sensor clip cable is not long enough it can be extended up to 50m but this must be done using a double twisted pair cable in order to stop any possible interference and a firm connection to the original cable is required. Try to keep the extension cable as short as possible, as the signal strength from the sensor is very low.

4. Installation Settings

Once the unit is wired, SOLARIMMERSION IV has to be configured with the parameters required for the particular installation type used. By default, for simple installations with a single heater, the only configuration requirements are listed below.

Follow the steps below to calibrate and setup the unit.

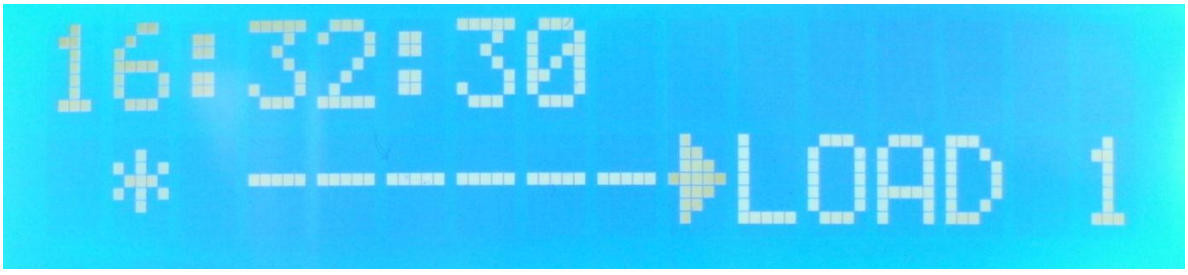
Step 1: Turn off the PV or micro generation system. This is to make sure power is only imported, which is essential for sensor clip calibration.

Step 2: Turn on SOLARIMMERSION IV unit.

Step 3: Turn on a high load like a kettle or a 2kW heater to make sure power is imported and wait for 5 seconds.

3a: If the sensor clip is installed correctly, the display will be as below with the **ASTERISK** symbol (*) Blinking.

3b: If the display is as below, then you have to swap the wiring on the CT sensor terminals. Once the terminals are swapped, restart the switch and make sure the display is as picture 3a.

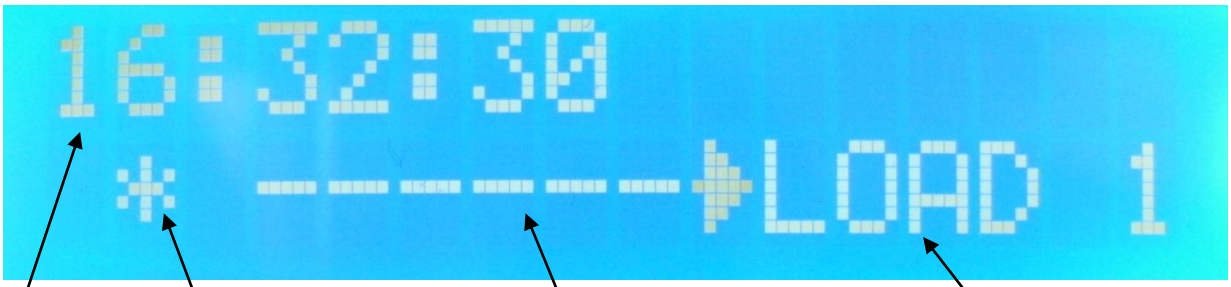


Step 4: Set the correct time & software settings according to the wiring mode selected. (Please see section 5. Using Menu Controls and "Internal Clock - setting the time" in Appendix 1)

Step 5: Turn the PV inverter back on. That completes the installation and SOLARIMMERSION IV should now start to divert any surplus power if available to the immersion heater or the connected load.

5. Using Menu Controls & Setting Time

When you have turned on the unit the default home screen will appear as shown in the imagine below. (This is the screen you will return to every time you press the "**ESC"** button)



Current time

Sun symbol constant - Surplus Energy available, divert active.

Sun symbol Blinking - No surplus available, divert on hold.

Load diverting indicator

Current Load This will be "LOAD 2"when the secondary load is activated.

There are **FIVE** control buttons underneath the LCD screen:

Override – (**OVR**) to activate the Override function (Hold for 2 seconds to activate)

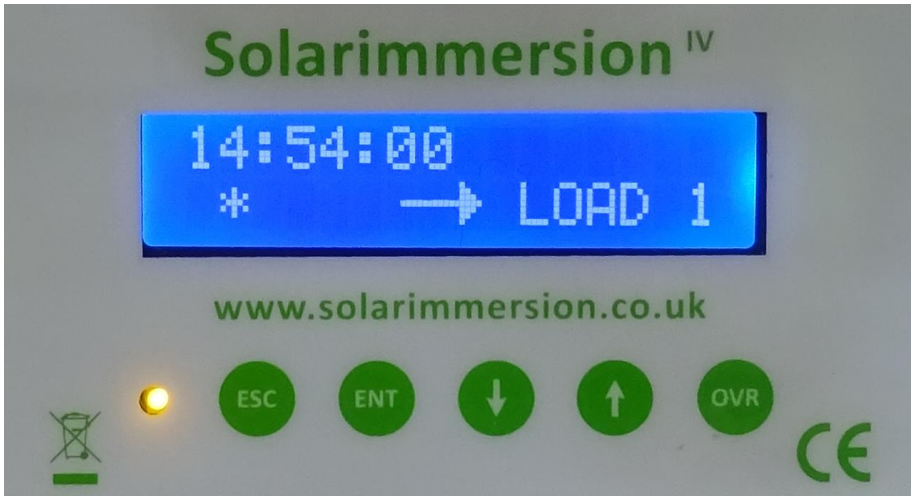
Up (↑) – to navigate through the Menu/Sub Menu options **or** to increase values

Down (↓) – to navigate through the Menu/Sub Menu options **or** to decrease values

Enter – (**ENT**) to select a Menu option or save new values

Escape – (**ESC**) to cancel an action and return to the default home screen

Yellow LED - Power ON indicator



Within the main menu there are 5 options which are listed below:

1. **Internal Clock**
2. **Override Button**
3. **Set Auto-Boost**
4. **Load 2**
5. **Factory Reset**

IMPORTANT

TO ACTIVATE THE MAIN MENU, PRESS THE “ENT” OR "ESC" BUTTON.

USE “UP” OR “DOWN” BUTTONS TO MOVE BETWEEN THE MENU OPTIONS. TO SELECT A MENU OPTION TO CHANGE, PRESS “ENT” BUTTON. ONCE THE CORRECT VALUE IS SELECTED USING THE “UP” AND “DOWN” BUTTONS, PRESS “ENT” BUTTON TO SAVE THE VALUE. THE SCREEN WILL RETURN TO THE DEFAULT HOME DISPLAY AFTER SAVING THE VALUE.

USE “ESC” BUTTON AT ANY TIME TO RETURN TO THE HOME SCREEN AND RETAIN THE NORMAL OPERATION OF THE SWITCH

LCD BACKLIGHT TURNS OFF AFTER 5 MIN TO SAVE ENERGY. PRESS ANY BUTTON TO TURN ON THE BACKLIGHT AGAIN

ALL MENU/ BUTTON OPERATIONS EXCEPT “OVR” SHOULD END BY PRESSING “ESC”.

Appendix – 1

Menu Options & Controls – Full List

1. Internal Clock - setting the time

Step no.	Button Action	Display	Description
	Start	16:23:03 → LOAD 1	Home
1	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
2	ENT	↓	
3	↓↑	SET TIME - HOUR 16:23:31	Set Time - Hours
4	ENT	↓	
5	↓↑	SET TIME - MINS 16:23:31	Set Time - Minutes
6	ENT	↓	
7	↓↑	SET TIME - SECS 16:23:31	Set Time - Seconds
8	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
9	ESC	↓	
	Finish	16:23:03 → LOAD 1	Home

2. Override Button - Setting the override function

Step no.	Button Action	Display	Description
	Start	16:23:03 → LOAD 1	Home
1	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
2	↓↑	↓	
		OVERRIDE BUTTON 0 MINUTES	Override button - Menu
3	ENT	↓	
4	↓↑	SET DURATION 0 MINUTES	Set Duration
5	ENT	↓	
		OVERRIDE BUTTON 1 MINUTES	Override button - Menu
6	ESC	↓	
	Finish	16:23:03 → LOAD 1	Home

3. Set Auto-Boost - Setting the auto-boost function

Step no.	Button Action	Display	Description
	Start	16:23:03 LOAD 1	**Home**
1	**ENT**	↓	
		INTERNAL CLOCK 16:23:29	**Clock - Menu**
2	**↓↑**	↓	
		AUTO-BOOST TIMES 1=OFF 2=OFF	**Auto Boost Times - Menu**
3	**ENT**	↓	
		SET AUTO-BOOST 1 00:00 (00 MINS)	**Set Auto-Boost 1**
4	**ENT**	↓	
5	**↓↑**	SET AUTO-BOOST 1 00:00 (00 MINS)	**Set Auto-Boost 1 - Time Hour**
6	**ENT**	↓	
7	**↓↑**	SET AUTO-BOOST 1 00:00 (00 MINS)	**Set Auto-Boost 1 - Time Minutes**
8	**ENT**	↓	
9	**↓↑**	SET AUTO-BOOST 1 00:00 (00 MINS)	**Set Auto-Boost 1 - Length Minutes**
10	**ENT**	↓	
11	**ESC to exit** (if only 1 Auto-Boost setting required) **OR** **↓↑ to set Auto-Boost 2** (if setting a second Auto-Boost required)	SET AUTO-BOOST 1 20:00 (60 MINS)	**Set Auto-Boost 1 - Menu** **OR** **Set Auto-Boost 2 - Menu** (repeat "Set Auto-Boost 1" menu steps)
		↓	
		AUTO-BOOST TIMES 1=20:00 2=OFF	**Auto-Boost Times - Menu**
12	**ESC**	↓	
		16:32:30 LOAD 1	**Home**

4. Load 2 - Setting the secondary load

Step no.	Button Action	Display	Description
	Start	16:23:03 → LOAD 1	Home
1	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
2	↓↑	↓	
		LOAD 2 DISABLED	Load 2 - Menu
3	ENT	↓	
4	↓↑	LOAD 2 DISABLED	Load 2 - Disabled
		↓	
5	↓↑	LOAD 2 ENABLED 30 mins	Load 2 - 30 mins option (For 60mins Press ↓↑ again)
6	ENT	↓	
		LOAD 2 ENABLED 30 mins	Load 2 - Enabled for 30 mins/60mins
7	ESC	↓	
	Finish	16:23:03 → LOAD 1	Home

8. Factory Reset - setting the unit to factory settings

Step no.	Button Action	Display	Description
	Start	16:23:03 → LOAD 1	Home
1	ENT	↓	
		INTERNAL CLOCK 16:23:29	Clock - Menu
2	↓↑	↓	
		FACTORY RESET	Factory Reset - Menu
3	ENT	↓	
4		ARE YOU SURE? UP=YES ESC=NO	Factory Reset - confirmation
5	↑ (YES)	↓	
		LOADING FACTORY DEFAULT SETTINGS	Unit resetting to Factory settings
		↓	
	Finish	16:23:03 → LOAD 1	Home

Support

User Installation query - Consult a qualified installer / electrician.

Technical support for qualified installers and electricians please call us on **0845 519 8729**

Online Support System - If you require any assistance, please submit your query to the Technical Support team via the link shown below.

http://solarimmersion.co.uk/solarimmersion-support/technical-support/

Warranty

Amelec Instruments Ltd warranty provides free repair or replacement cover for all faulty in parts and workmanship for 24 months from the date of purchase. Amelec Instruments Ltd obligation is limited to replacing parts which have been reported promptly and are so found by Amelec Instruments Ltd upon inspection. A valid proof of purchase is required if making a warranty claim.

Warranty is void in the event of improper accidental damage, unauthorised service, use of unauthorised components, misuse, natural disasters including lightning strike. This warranty does not extend to ancillary equipment not supplied by the manufacturer. No responsibility is assumed for incidental damage. No responsibility is assumed for consequential damage.

Faulty parts/Unit must be returned by prepaid post and accompanied by a Returns number available in advance from online ticket system.

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